DRIVING UNDER THE INFLUENCE: CORN ETHANOL & ENERGY SECURITY

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Introduction

Claims that corn ethanol is making a major contribution to America's security and energy independence by reducing oil imports are wildly exaggerated, an analysis by Environmental Working Group (EWG) shows. Between 2005 and 2009, taxpayers spent a whopping $17 billion to subsidize ethanol. In return, they got a reduction in overall oil consumption equal to an unimpressive 1.1 mile-per-gallon increase in overall fuel economy.

Ethanol's contribution to reducing U.S. dependence on imported oil looks even worse -- the equivalent of a paltry six-tenths-of-a-mile-per-gallon improvement in fuel economy fleet-wide. This degree of energy independence could have been accomplished for free by proper tire inflation, driving sensibly, obeying the speed limit and using the right grade of motor oil.

In terms of reducing consumption of fossil fuels in the transportation sector, including the fuel needed to produce ethanol and transport it to the market, the payoff is downright dismal. Less than half-of-a-mile-per-gallon increase in fleet-wide fuel economy would yield the same reduction in fossil fuel use as all 10.6 billion gallons of corn ethanol added to gasoline in 2009.

Claims for Corn Ethanol Are a Mirage

No one disputes the need to reduce America's dependence on oil to fuel our cars and trucks — whether that oil is imported (currently about 60 percent of U.S. consumption) or produced domestically. More importantly, we need to reduce our reliance on all fossil fuels. With that in mind, EWG took a hard look at how well corn ethanol is achieving both of these critical objectives.

US highway vehicles burned a total 139.5 billion gallons of fuel in 2009,[1] driving two trillion miles[2] while getting just over 20 miles per gallon.[3] Blended into these 139.5 billion gallons were 10.6 billion gallons of ethanol.[4] Most people understandably think that those 10.6 billion gallons of ethanol reduced our consumption of gasoline by the same amount. The reality is far different.

The problem is that the current blend of 10 percent ethanol, commonly called E10, cuts gas mileage by almost 4 percent, according to U.S. Department of Energy figures.[5] You simply can't drive as far on a gallon of E10 as on a gallon of conventional gasoline. That is because one gallon of ethanol yields only two-thirds as much energy as a gallon of gasoline. At the national level, this means that the 10.6 billion gallons of ethanol burned in 2009 displaced just 7.2 billion gallons of gasoline.

This amount of gasoline could have been displaced by increasing fleet-wide fuel economy by just 1.1 miles per gallon, at essentially no cost to taxpayers. Instead, Americans have spent $17 billion since 2005 to achieve this paltry reduction in gasoline consumption. According to the Department of Energy, drivers could improve their mileage that much by just a handful of easy, inexpensive measures.[6] Here they are:

Table 1: Simple Measures Could Boost US Vehicle's Fuel Economy

	Low Estimated Improvement (MPG)	High Estimated Improvement (MPG)
Average fuel economy of US fleet, 2009	20.0	
Driving sensibly, not aggressively	1.0	6.6
Observing the speed limit	1.4	4.6
Keeping engines properly tuned	0.8	0.8
Keeping tires properly inflated	0.6	0.6
Using the recommended grade of motor oil	0.2	0.4
Replacing clogged air filters	0.4	1.2

How Taxpayers Subsidize Ethanol

We all pay for ethanol through something called the "Volumetric Ethanol Excise Tax Credit," or VEETC. In 2005 this tax credit replaced earlier forms of ethanol subsidies that dated back to the late 1970s. The tax credit was originally pegged at 51 cents per gallon in the 2004 American Jobs Creation Act, but the 2008 Farm Bill reduced it to 45 cents per gallon. It is often called the "blenders' tax credit" because the credit actually goes to the companies that blend the ethanol with gasoline.

In 2009, thanks to VEETC, it cost taxpayers $4.8 billion to replace 7.2 billion gallons of gasoline with 10.6 billion gallons of ethanol. Between 2005 and 2009, taxpayers spent more than $17 billion on tax credits for ethanol production and use. Without a change in federal law we will all be on the hook for another $5.4 billion in 2010.

The VEETC tax credit is set to expire Dec. 31, 2010. If the ethanol industry succeeds in getting Congress to extend it, taxpayers will be out another $31 billion between 2011 and 2015. By 2015, taxpayers will have invested nearly $54 billion total to support production and use of corn ethanol.

Americans have spent $17 billion since 2005 to achieve reductions in gasoline consumption that could have been achieved for free.

Table 2: $54 Billion in Tax Credits for Ethanol

Year	ETHANOL PRODUCTION (MILLION GALLONS)	SUBSIDY (CENTS PER GALLON)	COST TO TAX-PAYER (BILLIONS)
2005	3.904	51	$1.991
2006	4.855	51	$2.476
2007	6.500	51	$3.315
2008	9.000	51	$4.590
2009	10.600	45	$4.770
2010	12.000*	45	$5.400*
2011	12.600*	45	$5.670*
2012	13.200*	45	$5.940*
2013	13.800*	45	$6.210*
2014	14.400*	45	$6.480*
2015	15.000*	45	$6.750*
Total	115.859		$53.592

*Note: Data from 2010 to 2015 are based on the levels of ethanol production required by the 2007 Energy Independence and Security Act.

Producing Ethanol Consumes Fossil Fuels

The waste and inefficiencies of corn ethanol are even worse than they appear, because most of the energy in corn ethanol actually comes indirectly from fossil fuels. It takes a lot of natural gas to fire the boilers at a corn ethanol plant. It also takes a lot of fossil fuel in the form of fertilizers and diesel fuel to grow, cultivate and transport the corn needed to produce ethanol. Some ethanol plants are more efficient than others, but Adam J. Liska of the University of Nebraska-Lincoln and colleagues reported in 2009 that the net energy ratio of the most common ethanol production

Ethanol Boosters' Hollow Claims:

Wesley Clark:

"I don't think there is any industry in America in which the good sense of making a profit is any more closely related to the good work of national security than this industry of ethanol. This is America's domestic growth fuel, and we need it for our country's security."
Keynote Address at 25th annual International Fuel Ethanol Workshop and Expo, June 15-18, 2009 Colorado Convention Center, Denver.
http://www.ethanolproducer.com/article.jsp?article_id=5771&q=Wesley%20June%2015&category_id=35

systems ranges from 1.5 to 1.8.[7] (The net energy ratio is the amount of energy a process yields divided by the amount of energy that goes into it.) Even using the higher estimate of the net energy ratio, this means that by the time a gallon of corn ethanol is pumped into your fuel tank, over half of the energy yield came from fossil fuels.

Increasing fleet-wide fuel efficiency by less than 0.4 miles per gallon in 2009 would have reduced our use of fossil fuels in transportation by as much as the 10.6 billion gallons of ethanol we consumed.

EWG took the calculations a step further. We know that 90 percent of the volume of a gallon of E10 is pure gasoline and all of its energy is fossil fuel energy. We also know that just over half of the energy in the ethanol comes, indirectly, from fossil fuels.

That means that in the end, about 96 percent of the total energy in a gallon of E10 comes from fossil fuels. Only about 4 percent comes from a true non-fossil source.

Because corn ethanol contains so much fossil fuel energy, simply increasing fleet-wide fuel efficiency by only 0.5 miles per gallon in 2009 would have reduced our use of fossil fuels in transportation by as much as the 10.6 billion gallons of ethanol we consumed.

Even a major increase in the energy efficiency of a corn ethanol plant doesn't change this picture significantly. For example, the study by Liska and colleagues cited earlier reported that an advanced closed-loop biorefinery with anaerobic digestion "increased the net energy ratio to 2.2 from 1.5 to 1.8 for the most common systems."[7] Yet EWG's calculations show that a 0.6-mile-per-gallon increase in fuel efficiency would have saved as much gasoline as using 10.6 billion gallons of ethanol produced by

Hollow Claims:

Growth Energy:
"America now imports the majority of its fuel, often from countries at risk or on shaky political ground with us. Switching to domestic energy is vital to our national security and the protection of our nation's energy supplies… Ethanol grown here, by American farmers, using American technology, is a vital part of that solution - and the only sustainable, domestic fuel that works in the gas-engine cars we already have."
May 18, 2010
http://www.growthenergy.org/ethanol-issues-policy/energy-security/

Sen. Tom Harkin (D-Iowa)
"America's addiction to foreign oil poses a clear and present danger to our national security. Fortunately, one of the best solutions to ending this addiction lies right here in the Hawkeye state. Iowa is leading the way in producing ethanol and biodiesel that can end our dependence on foreign oil."
July 10, 2006
http://harkin.senate.gov/press/column.cfm?i=258413

"Equally important, producing and using more biofuels are among our most important strategies for reducing our dependence on foreign oil."
Sept. 1, 2009
http://harkin.senate.gov/press/release.cfm?i=319174

Sen. Chuck Grassley (R-Iowa)
"Home-grown ethanol is the shining star in our efforts to reduce our dependence on dirty, imported fossil fuels."
October 2, 2009
http://grassley.senate.gov/news/Article.cfm?customel_dataPageID_1502=23472

such an advanced plant. This is because 95 percent of the energy in E10 would still come from fossil fuels even if the ethanol were produced in an advanced plant such as the one Liska et al. simulated.

An E15 Blend Would Compound the Problem

Higher percentage blends of ethanol just magnify the inefficiencies of ethanol. At E15, gas mileage would fall by 5 percent. At E20, it would fall by 8 percent.[5] Nationwide, E15 would displace about 10 billion gallons of gasoline. A mere 1.6-mile-per-gallon increase in fuel efficiency would reduce gasoline consumption just as much and save taxpayers almost $7 billion in tax credits each year.

Recommendations

Rather than charting a clear road to energy security, corn ethanol is at best a costly detour and, at worst, a disastrous dead end. It is an agricultural policy masquerading as energy policy -- a policy designed to soak up surplus corn, not to increase our energy security and reduce dependence on fossil fuels.

Rather than continuing to drive under the influence of corn ethanol, we need to:

1. Overhaul that Renewable Fuel Standard provisions of the 2007 Energy Independence and Security Act to:
    a. eliminate the provisions that, in effect, mandate production of corn ethanol, and
    b. require that any biofuel benefiting from federal mandates must meet rigorous environmental performance standards in addition to current greenhouse gas reduction requirements.
2. End tax credits for ethanol when they expire at the end of 2010.
3. End tax credits for all fossil fuels used for transportation.
4. Make fuel efficiency the spear point of efforts to improve energy security while developing a more comprehensive transportation strategy.
5. Invest more in research and evaluation to determine what role, if any, advanced biofuels should play in a comprehensive transportation energy strategy.

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